		Pushing the Enve	elope			
		2007 Science				
Grade Expectations						
Vermont Science						
Grades 5-6						
Activity/Lesson	State	Standards				
			Investigating and developing conclusions that			
Types of Engines (_		explain how the relative volume or mass of an			
pgs. 11-23)	VT	SCI.5-6.S5-6:9.1	object affects the density of the object.			
			Inertia is the tendency of an object to resist a			
			change in motion and depends upon the object's			
T		0015005	mass. Stationary objects tend to remain			
Types of Engines (\ /T	SCI.5-6.S5-	stationary; moving objects tend to continue			
pgs. 11-23)	VT	6:20.a	moving (Newton's First Law).			
			Investigating variables that change an object's			
Turner of Francisco (0015005	speed, direction, or both, and identifying and			
Types of Engines (VT	SCI.5-6.S5-	describing the forces that cause the change in			
pgs. 11-23)	VT	6:21.1 SCI.5-6.S5-	motion.			
Types of Engines (VT	6:21.a	A force applied to a moving object will change			
pgs. 11-23)	VI	6.21.a	the object's speed, direction or both. Energy is required to transform the physical			
			state of a substance from solid to liquid to gas,			
Chemistry (pgs. 25-		SCI.5-6.S5-	while conserving mass. Physical changes are			
41)	VT	6:14.a2	reversible.			
41)	VI	0.14.82	leversible.			
			Observing evidence of simple chemical change			
			to identify that new substances are formed when			
Chemistry (pgs. 25-		SCI.5-6.S5-	a chemical reaction has occurred (e.g., rusted			
41)	VT	6:15.1	nail, vinegar combined with baking soda).			
,		0.10.1	Design an investigation to collect evidence			
			about an object's inertia and explaining their			
Physics and Math		SCI.5-6.S5-	observation in terms of the object's tendency to			
(pgs. 43-63)	VT	6:20.1	resist a change in motion.			
,			Inertia is the tendency of an object to resist a			
			change in motion and depends upon the object's			
			mass. Stationary objects tend to remain			
Physics and Math		SCI.5-6.S5-	stationary; moving objects tend to continue			
(pgs. 43-63)	VT	6:20.a	moving (Newton's First Law).			
			Investigating variables that change an object's			
			speed, direction, or both, and identifying and			
Physics and Math		SCI.5-6.S5-	describing the forces that cause the change in			
(pgs. 43-63)	VT	6:21.1	motion.			
Physics and Math		SCI.5-6.S5-	A force applied to a moving object will change			
(pgs. 43-63)	VT	6:21.a	the object's speed, direction or both.			
Rocket Activity (pgs.		SCI.5-6.S5-	A force applied to a moving object will change			
69-75)	VT	6:21.a	the object's speed, direction or both.			
		Pushing the Enve				
		2007 Science				
Vanna aut Oalesses		Grade Expectati	ons			
Vermont Science						
Grades 7-8	State	Ctondoudo				
Activity/Lesson	State	Standards				

			Describing and explaining how the acceleration
			of an object is proportional to the force on the
Types of Engines (SCI.7-8.S7-	object and inversely proportional to the mass of
pgs. 11-23)	VT	8:19.2	the object.
			Acceleration is a relationship between the force
Types of Engines (SCI.7-8.S7-	applied to a moving object and the mass of the
pgs. 11-23)	VT	8:19.c	object (Newton's Second Law).
Types of Engines (SCI.7-8.S7-	Unbalanced forces will cause changes in speed
pgs. 11-23)	VT	8:21.c	or direction of an object's motion.
			Using real world examples (tires, balloons,
			soda), predict and explain the effect that a
Chemistry (pgs. 25-		SCI.7-8.S7-	change in one variable (pressure, temperature
41)	VT	8:13.1	or volume) will have on the others.
			There exists a predictable relationship among
Chemistry (pgs. 25-		SCI.7-8.S7-	the volume, temperature, and amount of a gas
41)	VT	8:13.a	and the pressure the gas exerts.
			For any specified amount of a gas, the pressure
			that the gas exerts will increase as the
			temperature increases or the volume of the gas
			decreases. The pressure that the gas exerts will
Chemistry (pgs. 25-		SCI.7-8.S7-	decrease as the temperature decreases or the
41)	VT	8:13.b	volume of the gas increases.
			Acceleration is a relationship between the force
Physics and Math		SCI.7-8.S7-	applied to a moving object and the mass of the
(pgs. 43-63)	VT	8:19.c	object (Newton's Second Law).
			Discussion of describing of the characters
			Diagramming or describing, after observing a
			moving object, the forces acting on the object
Dhysics and Math		0017007	before and after it is put into motion (Students
Physics and Math	VT	SCI.7-8.S7- 8:21.1	include in their diagram or description, the effect
(pgs. 43-63)	VI	0.21.1	of these forces on the motion of the object.)
Physics and Math		SCI.7-8.S7-	An object that is not subjected to a force will
(pgs. 43-63)	VT	8:21.a	continue to move at a constant speed and in a
(pgs. 43-63)	VI	0.Z1.d	straight line. If more than one force acts on an object along a
			straight line, then the forces will reinforce or
Physics and Math		SCI.7-8.S7-	cancel one another, depending on their direction
(pgs. 43-63)	VT	8:21.b	and magnitude.
Physics and Math	VI	SCI.7-8.S7-	Unbalanced forces will cause changes in speed
(pgs. 43-63)	VT	8:21.c	or direction of an object's motion.
(pgs. 1 5-05)	VI	0.21.0	Momentum is the characteristic of an object in
			motion that depends on the object's mass and
			velocity. Momentum provides the ability for a
Rocket Activity (pgs.		SCI.7-8.S7-	moving object to stay in motion without an
69-75)	VT	8:19.b	additional force.
00-10)	V I	0.13.0	Acceleration is a relationship between the force
Rocket Activity (pgs.		SCI.7-8.S7-	applied to a moving object and the mass of the
69-75)	VT	8:19.c	object (Newton's Second Law).
00-10)	V 1	0.13.0	jobject (Newton's Decond Law).

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			Diagramming or describing, after observing a
			moving object, the forces acting on the object before and after it is put into motion (Students
Rocket Activity (pgs. 69-75)	VT	SCI.7-8.S7- 8:21.1	include in their diagram or description, the effect of these forces on the motion of the object.)
00 70)	V 1	0.21.1	An object that is not subjected to a force will
Rocket Activity (pgs.		SCI.7-8.S7-	continue to move at a constant speed and in a
69-75)	VT	8:21.a	straight line.
			If more than one force acts on an object along a
			straight line, then the forces will reinforce or
Rocket Activity (pgs.		SCI.7-8.S7-	cancel one another, depending on their direction
69-75)	VT	8:21.b	and magnitude.
Rocket Activity (pgs.	\	SCI.7-8.S7-	Unbalanced forces will cause changes in speed
69-75)	VT	8:21.c	or direction of an object's motion.
		Pushing the En	
		2007 Scien	
V		Grade Expecta	ations
Vermont Science Grades 9-12			
Activity/Lesson	State	Standards	
Activity/Ec33011	Otate	Otaridards	If an unbalanced force acts on an object it will
			accelerate; the acceleration is proportional to
			the net force and inversely proportional to the
			mass of the object (Newton's Second Law
Types of Engines (SCI.9-12.S9-	F=ma). (e.g. A vehicle accelerates more slowly
pgs. 11-23)	VT	12:21.b	when it's full of passengers.)
Chamiatry (nga 25		SCI.9-12.S9-	There are specific proportional relationships that exist among volume, pressure, temperature and
Chemistry (pgs. 25-41)	VT	12:13.a	amount of gas (mass) in a system.
71)	VI	12.13.4	The total mass of reactants of any chemical
			reaction is the same as the total mass of the
Chemistry (pgs. 25-		SCI.9-12.S9-	products of that chemical reaction (Conservation
41)	VT	12:15.a	of Mass).
			An object at rest or moving uniformly (in a
			straight line) will remain so unless acted upon by
			an external unbalanced (net) force (Newton's First Law, The Law of Inertia). (e.g., We wear
Physics and Math		SCI.9-12.S9-	seatbelts because our body has a tendency to
(pgs. 43-63)	VT	12:20.a	keep moving when the vehicle stops.)
(pge. 10 00)		12.20.0	Every body continues in its state of rest or in a
			straight line, unless it is compelled to change
Physics and Math		SCI.9-12.S9-	that state by forces impressed upon it (Newton's
(pgs. 43-63)	VT	12:21.a	First Law).
			If an unbalanced force acts on an object it will
			accelerate; the acceleration is proportional to
			the net force and inversely proportional to the
Dhysics and Math		CCI 0 42 C0	mass of the object (Newton's Second Law
Physics and Math (pgs. 43-63)	VT	SCI.9-12.S9- 12:21.b	F=ma). (e.g. A vehicle accelerates more slowly when it's full of passengers.)
(µys. 43-03)	V I	12.21.0	when it's full of passerigers.)

Rocket Activity (pgs. 69-75)	VT	SCI.9-12.S9- 12:20.a	An object at rest or moving uniformly (in a straight line) will remain so unless acted upon by an external unbalanced (net) force (Newton's First Law, The Law of Inertia). (e.g., We wear seatbelts because our body has a tendency to keep moving when the vehicle stops.)
Rocket Activity (pgs. 69-75)	VT	SCI.9-12.S9- 12:21.a	Every body continues in its state of rest or in a straight line, unless it is compelled to change that state by forces impressed upon it (Newton's First Law).
Rocket Activity (pgs. 69-75)	VT	SCI.9-12.S9- 12:21.b	If an unbalanced force acts on an object it will accelerate; the acceleration is proportional to the net force and inversely proportional to the mass of the object (Newton's Second Law F=ma). (e.g. A vehicle accelerates more slowly when it's full of passengers.)
Rocket Activity (pgs. 69-75)	VT	SCI.9-12.S9- 12:21.c	Whenever one object exerts a force on a second object, a force equal in magnitude but opposite in direction is exerted on the first object. Forces always arise in pairs (Newton's Third Law). (e.g., When you lean against a wall, the wall pushes back at you.)